

CLAIMS

I/we claim:

1. A head lamp that forms a luminous distribution pattern having a horizontal cutoff line in an upper end portion and an
5 protrusion that protrudes upward from said horizontal cutoff line, said lamp comprising:

at least one lighting device unit that conducts illumination for forming said upward protrusion, each of said lighting device units comprising,

10 a light source configured by a semiconductor light emitting device having a plurality of light emitting chips horizontally arranged in a row and being forward directed, and

15 a projection lens, disposed in front of said light source, that projects an inverted image of said light source toward a front of said head lamp.

2. A head lamp according to claim 1, wherein said light emitting chips are arranged on a focal plane of said
20 projection lens.

3. A head lamp according to claim 1, wherein each of said light emitting chips has a substantially parallelogram shape.

25 4. A head lamp according to claim 1, wherein said at least one lighting device unit comprises a plurality of lighting device units, and wherein corresponding pitches of each of said light emitting chips are slightly different from one another by a predetermined amount.

30 5. A head lamp according to claim 1, wherein said projection lens is integrated with said light source to hermetically seal said plurality of light emitting chips of said light source.

35 6. A lamp that forms a luminous distribution pattern

having a horizontal component and an upwardly extending oblique component, said lamp comprising:

a first lighting system horizontally positioned at a lower portion of said lamp and generating a first diffuse light;

a second lighting system horizontally positioned at an upper portion of said lamp and generating a second diffuse light; and

a third lighting system horizontally positioned at a middle portion of said lamp and generating a focused light that varies with the horizontal swinging of said lamp, said third lighting system including at least one lighting unit including,

a plurality of light emitting units each having a substantially parallelogram shape and horizontally positioned with respect to each other on an arcuate shaped plane, and

a projection lens having a shape corresponding to said arcuate projection plane, said projection lens projecting an image of said at least one lighting unit toward a front of said lamp to form said oblique component.

7. The lamp of claim 6, wherein a focal length of said third lighting system exceeds a focal length of said first lighting system and a focal length of said second lighting system, and at least one of said first and third light systems form said horizontal component.

8. The lamp of claim 6, wherein said plurality of light emitting units comprises three light emitting units such that (a) when said lamp is horizontally swung left, a first one of said light emitting units is transited to its ON position, (b) when said lamp is positioned substantially parallel with respect to a direction of travel, a second one of said light emitting units is transited to its ON position, and (c) when said lamp is horizontally swung right, a third one of said light emitting units is transited to its ON position.

9. The lamp of claim 8, wherein said second one of said light emitting units is positioned between said first and third ones of said light emitting units on said arcuate shaped plane, such that a right oblique side of said second one of said light emitting units passes through an optical axis of said at least one lighting unit.

10. The lamp of claim 6, wherein said first lighting system comprises:

a first system light emitting unit positioned directly above an optical axis of said first lighting system; and

a first system projection lens positioned along said optical axis a distance in front of said first system light emitting unit.

11. The lamp of claim 6, wherein said second lighting system comprises:

a second system light emitting unit positioned directly above an optical axis of said second lighting system; and

a second system projection lens positioned along said optical axis a distance in front of said second system light emitting unit.

12. The lamp of claim 6, wherein said plurality of light emitting units comprises four light emitting units such that (a) when said lamp is positioned substantially parallel with respect to a direction of travel, at least one central one of said light emitting units is transited to its ON position, (b) when said lamp is horizontally swung left, at least one of said light emitting units on a first side of said at least one central one of said light emitting units is transited to its ON position, and (c) when said lamp is horizontally swung right, at least one of said light emitting units on a second side of said at least one central one of said light emitting units is transited to its ON position.

13. The lamp of claim 12, wherein said at least one central one of said light emitting units is positioned on said arcuate shaped plane, such that a right oblique side thereof passes through an optical axis of said at least one lighting unit, and is about a half pitch apart from a pitch of an adjacent one of said at least one lighting unit of said third lighting system.

14. The lamp of claim 6, wherein said parallelogram-shaped light emitting units have oblique sides inclined at about 45 degrees in a right upward direction with respect to substantially horizontal upper and lower sides of said light emitting units.